User Manual

AHED_CAM_ADAPT_EV76C560_CS

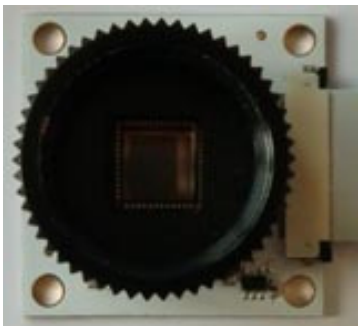

Fig.1. Top side view of "AHED_CAM_ADAPT_EV76C560_CS"

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Overview

"AHED_CAM_ADAPT_EV76C560_CS" is an image sensor headboard for the FPGA board "AHED_MFB_MB". This camera module is built around a 1.3 MegaPixel 1/1.8" CMOS image sensor EV76C560 by E2V. With the CS mount lens holder and an optional CS Mount to C Mount adapter ring this module is compatible to wide variety of off-the-shelf lenses.

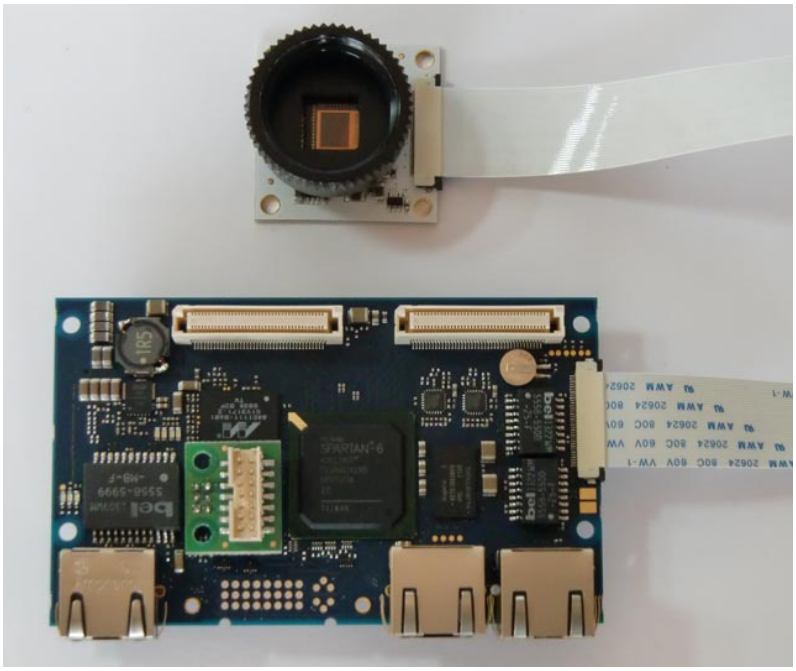

Fig.2: Top side view of camera module "AHED_CAM_ADAPT_EV76C560_CS" connected to "AHED_MFB_MB"

Key Features

- 1/1.8" sensor -> large 5.3 µm square pixel cells for superior low light image quality
- Thanks to the FFC cable and the compact design the image sensor module can be placed dozens of centimeters away from the controlling FPGA board in space constrained locations
- With the CS Mount lens holder and the optional CS Mount to C Mount adapter ring a wide variety of lenses can be used
- Flexible Region Of Interest (ROI) functionality of the image sensor allows for allocating the available maximum pixel rate of ~ 90 Mpixel/s to either sampling the full 1.3 MegaPixel @ 60 Hz or only a small region of it, which could be in an extreme case only a single line @ several kHz
- Direct access to image sensor with its 10 bit pixel interface and SPI port for configuration
- Flexible triggering and illumination control by means of the FPGA board
- Powered entirely over the FFC cable

Applications

- Adds a camera input to the FPGA board “AHED_MFB_MB“
- Scientific experiments
- Industrial control
- Astronomy

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1. Dimensions/Mechanics

- The actual board has a size of 35 x 35 mm.
- The board has 4 mounting holes with a nominal diameter of 3.2 mm
- The CS Mount lens holder is glued and/or screwed to the PCB and has a height of ~ 16 mm above the PCB
- An optional CS Mount to C Mount adapter ring (see Fig.5) can make the board compatible with C Mount optics
- Contrary to the images shown here the PCB is not guaranteed to have a white soldermask. However, this has no influence on the electrical/optical properties of this module

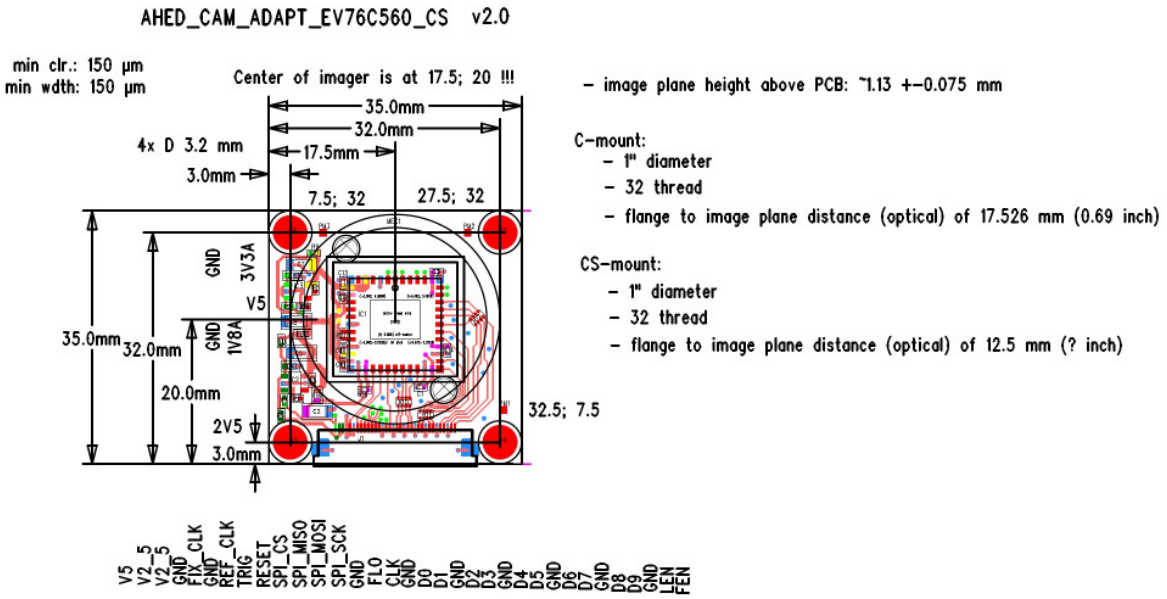

Fig.3. Top side drawing of "AHED_CAM_ADAPT_EV76C560_CS"

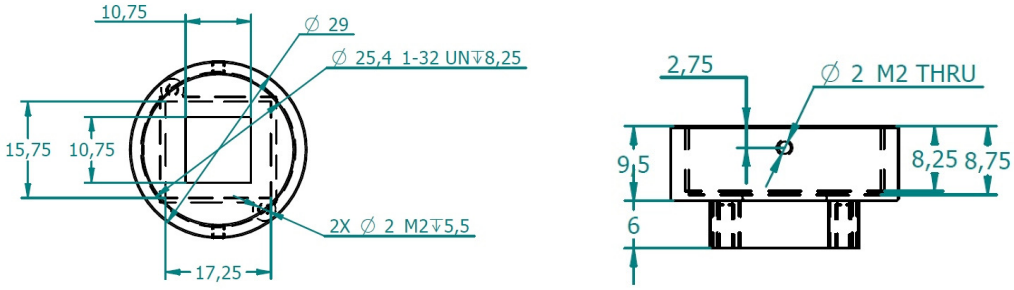

Fig.4. Top side view next to side view of CS Mount lens holder

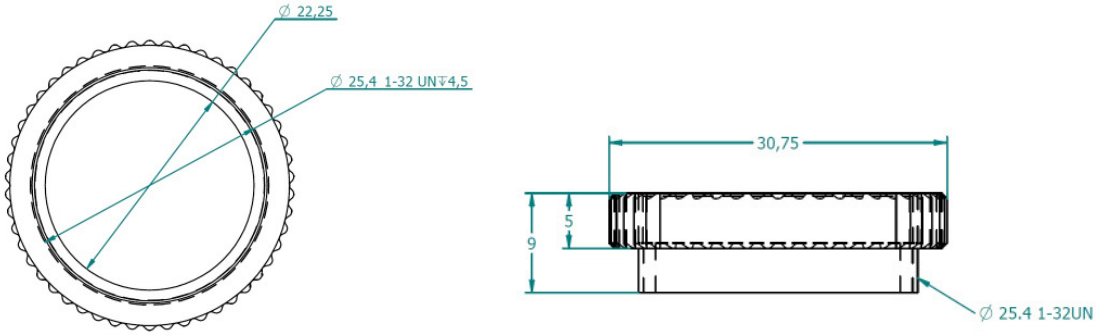

Fig.5: Top side view next to side view of optional CS Mount to C Mount adapter ring

2. Power Supply

- The board is entirely powered over the FFC cable.
- It's supplied with 5.0 V and 2.5 V from the FPGA board "AHED_MFB_MB"
- Internal voltage rails (3.3 V and 1.8 V) are derived from these external voltages by LDOs for lowest system noise.

3. Components

3.1. E2V EV76C560

- 1.3 MPixel CMOS image sensor (1280 x 1024)
- 5.3 µm square pixels with micro lenses
- Optical format 1/1.8" (6.9 x 5.5 mm)
- Frame rate of 60 fps at full resolution to many kHz in single line mode
    - Multi-ROI (Region of Interest) mode to sample only certain regions at higher frame rates
    - Pixel rate of up to 90 Mpixel/s
- High dynamic range (HDR) capabilities
    - Single exposure dynamic range of > 62 dB (@ 25°C, ERS mode)
    - Internal 10-bit ADC and 10-bit or 8-bit digital data output
- Global or rolling shutter operation mode
- On-chip histogram calculation

- SPI configuration interface
- Power consumption < 200 mW

4. Clocking

- Up to two reference clock signals (“FIX_CLK”, “ REF_CLK“) are provided from the FPGA board “”AHED_MFB_MB” to the sensor headboard. From these reference clocks the sensor chip derives its internal clock signals for image conversion and the digital interface by means of an on-chip PLL under the control of the SPI interface

5. JTAG

- There is a no JTAG capable device on this board

6. FFC Connector

- The board is equipped with a 34-pin FFC connector with 0.5 mm pitch. The signal pinning is shown in Fig.3
- So far it’s only expected that this module is used with the FPGA board “AHED_MFB_MB“. For this case a top level design can be provided, up on request, that shows the final image sensor signal assignment to the FPGA signals.
- Beyond that, up on request, a reference design (netlist + C-code) attaching the image sensor via DMA to a MicroBlaze soft-core processor working on the DDR3 memory can be provided.

7. Environmental Conditions

- The allowed operating temperature of the image sensor is -30°C to 65°C. It should be notes that achievable SNR and dynamic range will degrade with rising temperature

8. Errata

- None

9. Important Information

10. Installation

11. Default Configurations

- AHED_CAM_ADAPT_EV76C560_CS_STD
  - Monochrome version EV76C560ABT of the E2V CMOS image sensor
  - The CS Mount lens holder is glued and or screwed to the PCB
  - The optional CS Mount to C Mount adapter ring is not included
  - An FFC cable of 300 mm length (type B1) is included

12. Options (up on request, minimum order quantities do apply)

- Color version (Bayer pattern) EV76C560ACT of the E2V CMOS image sensor
- 2 MPixel (1600 x 1200) version with EV76C570
- Different length and/or type of FFC cable

13. Accessories

- Optional CS Mount to C Mount adapter ring
- Different length of FFC cables

14. Legal Notices

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